

Class: EMBRYOLOGY 96/7 Course #: EMBRY967

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Date: 4-25-1997

	B	A			
Test Key:	BDDCADDCE	CBBEEBABAC	DBCACBC CD	AECCBCACEB	ADDBDDEAAB
Items 1-50:	1234567890	1234567890	1234567890	1234567890	1234567890
Student's Answers:	*****D	*****D****	***D*** **	*****E***E	DBEDA****C

Test Key:	ECDADBDECA	CBDDDBBAAA	ABDBACBBBB	BBBBBAAABB	BBDDCCBABA
Items 51-100:	1234567890	1234567890	1234567890	1234567890	1234567890
Student's Answers:	***E*****	D*****C***	*****	*****	*E*****D**B

EXAM 1 Form A

Possible Points: 99

Raw Score: 82

NAME

DATE

Sunita Saini
4/16/97

EMBRYOLOGY EXAM

1. Which of the following structures is not derived from neuroectoderm?

- A. Retinal pigment layer
- B. Corneal epithelium
- C. Epithelium of iris
- D. Retinal nervous layer
- E. Optic nerve

2. Hyaluronic acid plays an important role in the development of the:

- A. Retinal nervous layer
- B. Iris
- C. Lens
- D. Cornea
- E. Lacrimal gland

3. A newborn has unilateral congenital aphakia (no lens). The embryological origin of this defect is related to which of the following?

- A. Neural crest cells
- B. Surface ectodermal placode
- C. Mesenchymal cells
- D. Cells of the optic cup
- E. Neuroepithelial cells

4. A typical coloboma of the retina or iris is the result of:

- A. Failure of fusion of pigmented and neural layers of the optic cup
- B. Persistence of the hyaloid artery
- C. Failure of closure of the optic (choroid) fissure
- D. suppression of median cerebral structures of the cranial part of the neural plate
- E. Microphthalmos

5. The vitreous body within the cavity of the optic cup is derived from:

- A. Mesenchyme
- B. Neuroepithelium
- C. Surface ectoderm
- D. Ectodermal placode
- E. Endoderm

6. The scala vestibuli and scala tympani originate from the:

- ~~A.~~ Otic vesicle ectoderm
- ~~B.~~ Endoderm of the 1st pharyngeal pouch
- ~~C.~~ Neuroectoderm
- ~~D.~~ Mesenchyme around the otic vesicle
- ~~E.~~ Ectoderm of the 1st pharyngeal groove (cleft)

7. All of the following statements are true EXCEPT:

- A. The bony labyrinth develops from mesenchyme around the otic vesicle. ✓
- ~~B.~~ The stapes is a derivative of the 2nd ^abranchial arch. ✓
- ~~C.~~ The tympanic membrane develops from ectoderm, mesoderm, and endoderm. ✓
- ~~D.~~ The meatal plugs are related to the second ^abranchial groove (cleft). ✓
- E. The spiral organ of Corti traces its origin back to the otic vesicle. ✓

8. All of the following statements are true EXCEPT:

- A. Endolymph has its origin from developing otic vesicle ectoderm. ✓
- B. The tensor tympani muscle to the malleus is innervated by the Vth cranial nerve. ✓
- C. The sensory receptors in the semicircular canals, utricle and saccule are derived from surface ectoderm. ✓
- ~~D.~~ The sensory ganglia of hearing and equilibrium are products of the neuroepithelium. ✓
- E. Congenital deafness may be caused by a Rubella infection during the 7th and 8th weeks of development critical period for inner ear development. ✓

9. All of the following statements are true EXCEPT:

- A. Congenital detachment of the retina is a condition where the pigmented and neural layers of the developing retina remain separated. ✓
- B. Absence of the eye (anophthalmos) is usually accompanied by other severe craniocerebral anomalies. ✓
- ~~C.~~ The lacrimal glands are large at birth and are functional, enabling the newborn to produce tears. ✓
- D. Congenital cataract is characterized by opacity of the lens. ✓
- E. During development, the inner lens fibers are the older fibers and are added to from the outer germinative and mitotic cells. ✓

10. A newborn was found to have a large swelling over the lower lumbar vertebral column. The swelling had an oval raw area which was discharging clear fluid (CSF). There was involvement of nerves to the lower extremity. Your diagnosis would be

- ~~A.~~ Spina bifida occulta
~~B.~~ Arnold-Chiari malformation
~~C.~~ Spina bifida with meningocele
D. Spina bifida with meningomyelocele
~~E.~~ Spina bifida with myeloschisis

11. At the 6th month of development, the conus medullaris (tip of the spinal cord) can be located at approximately the level of vertebral body.

- ~~A.~~ C 4
~~B.~~ C 1
~~C.~~ S 1
~~D.~~ L 3
E. L 1

S1 L3 L1-L2

12. Failure of myelination of the nerve processor within the CNS is likely to be related to abnormal development of:

- ~~A.~~ Neural crest Schwann cells
~~B.~~ Neuroepithelial oligodendrocytes
~~C.~~ Microglial cells
~~D.~~ Astrocytes
E. Unipolar neurons

13. In early embryonic development, the dorsoventral and anteroposterior axes are fixed by action of batteries of:

- ~~A.~~ Pair-rule genes
B. Maternal effect genes
~~C.~~ Segment polarity genes
~~D.~~ CAMs
E. Pair-box genes



14. All of the following are major derivatives of the neural crest EXCEPT:

- A. Squamosal and part of frontal cranial vault ✓
B. Parasympathetic ganglia ✓
C. Sensory ganglia of cranial nerves V, VII, IX AND X ✓
D. Adrenal medulla ✓
E. Motor and sensory nuclei of the CNS

15. All of the following are considered to be major neurocristopathies (Neural crest origin) EXCEPT

- A. Neurofibromatosis (von Recklinghausen disease) ✓
- B. Pheochromocytoma (tumor of chromaffin cells of adrenal medulla) ✓
- C. CHARGE association ✓
- D. Waardenburg Syndrome ✓
- E. Arnold-Chiari malformation

16. The outer gray matter (external germinal layer) of the cerebellum has its origin from:

- A. Neural crest cells
- B. Neuroepithelial cells (neuroblasts)
- C. Marginal layer of the rhombic lip
- D. Cells of the deep cerebellar nuclei
- E. Tela choroidea

17. All of the following statements are true EXCEPT:

- ~~A. Myelination begins in the peripheral nervous system with the sensory roots before the motor roots.~~
- B. Myelination in the CNS is first seen in the sensory tracts (e.g. in the visual system) ✓
- C. Myelination in complex pathways in the cerebral cortex occurs after birth ✓
- D. Myelination continues after birth ✓
- E. Many of the first born movements are reflex in nature and not the result of fully myelinated motor CNS tracts. ✓

18. The special visceral afferent (SVA) group of nuclei associated with taste originates from:

- A. Neural crest cells
- B. Alar plates
- C. Basal plates
- D. Floor plates
- E. Ectodermal placodes

19. The tela choroidea essentially consists of:

- A. Ependyma and pia mater
- B. Dura mater and arachnoid
- C. Ependyma only
- D. Pia mater only
- E. Pia, arachnoid and dura mater

20. An infant (appearing normal at birth) has brought to the emergency room shortly after birth because its head was growing excessively due to accumulation of CSF. Ultrasound should enlarged ventricles but no cerebral hemispheres. Your diagnosis would be:

- ~~A.~~ Meningomyelocele
- ~~B.~~ Arnold-Chiari malformation
- ☒ C. Hydranencephaly with hydrocephalus
- ~~D.~~ Pure case of hydrocephalus due to obstruction of the aqueduct
- ~~E.~~ Megalocephaly (enlarged calvaria and brain)

21. The epithalamus, thalamus, hypothalamus, pineal gland, infundibulum and mammillary bodies have their origin from the original:

- medulla*
pons, cerebellum
midbrain
cerebral hemi
- ~~A.~~ Myelencephalon
 - ~~B.~~ Metencephalon
 - ~~C.~~ Mesencephalon
 - ☒ D. Diencephalon
 - ~~E.~~ Telencephalon

22. Mesenchymal cells give rise to which of the following?

- B*
- ~~A.~~ Oligodendrocytes
 - ☒ B. Microglial cells ✓
 - ~~C.~~ Astrocytes
 - ~~D.~~ Ependymal cells
 - ~~E.~~ Schwann cells

23. Which of the following statements regarding the intermediolateral gray column of the spinal cord is true?

- C*
- ~~A.~~ It forms from the alar plates
 - ~~B.~~ It is of neural crest origin
 - ☒ C. It gives rise to preganglionic fibers of the sympathetic nervous system
 - ~~D.~~ It is associated with sensory functions
 - ~~E.~~ It is found throughout the entire length of the spinal cord

24. Which of the following developing structures follows the developing ventricles into the temporal lobes?

- A*
- ~~A.~~ Corpus striatum
 - ~~B.~~ Posterior commissure
 - ~~C.~~ Habenular commissure
 - ☒ D. Corpus callosum
 - ~~E.~~ Optic chiasma

25. The thalamus and hypothalamus take their origin from:

- A/C
- ☒ A. Alar plates
 - ☐ B. Basal plates
 - ☐ C. Neuroepithelium
 - ☐ D. Intermediolateral gray
 - ☐ E. Neural crest cells

26. The caudate and lentiform nuclei of the corpus striatum are separated by the internal capsule which originates from:

- B
- ☒ A. Surface ectoderm
 - ☒ B. Neuroepithelial cells of the cerebral hemispheres
 - ☐ C. Neural crest cells
 - ☒ D. Cells from the developing substantia nigra
 - ☒ E. Cells from the early hippocampus

27. The term rachischisis refers to a defect in the development of:

- C
- ☒ A. Membranous bones of the skull
 - ☒ B. Cranial meninges
 - ☒ C. Vertebral column
 - ☒ D. Cerebral hemispheres
 - ☒ E. Choroid plexus

28. All of the following statements are true EXCEPT:

- X
- ☐ A. The expanding temporal frontal and parietal lobes cover areas of the cortex known as the insula.
 - ☒ B. The lamina terminalis is merely the medial rostral wall of the telencephalon, but serves no other developmental purpose.
 - ☐ C. The morphological dominant part of the cerebral hemisphere are the archicortex and paleocortex.
 - ☒ D. The otic placodes are associated with the telencephalon. *rhomben*
 - ☒ E. The telencephalon foramina of Monro connect the 3rd and 4th ventricles.

29. Which of the following conditions is the MOST devastating to the developing embryo and fetus (Life Threatening)?

- C
- ☒ A. Agenesis of the cerebellum
 - ☒ B. Meningoencephalocele
 - ☒ C. Anencephaly or Meroanencephaly
 - ☒ D. Hydrocephalus
 - ☒ E. Arnold-Chiari malformation

30. Which of the following statements is true?

- A. The pyramids of the myelencephalon are derived from the basal plates.
B. The cervical flexure is at the junction of the mesencephalon and metencephalon.
C. The olivary nuclei are derived from the basal plates.
D. The superior and inferior colliculi of the mesencephalon are derived from the alar plates.
E. The crus cerebri (cerebral peduncles) of the mesencephalon are derived from the basal plates.

31. Which of the following does not belong in this grouping

- A. Follicular cells of thyroid gland
B. Parafollicular cells of thyroid gland
C. Cells related to superior parathyroid gland
D. Cells related to thymus
E. Cells related to inferior parathyroid gland

32. Which of the following does not belong in this grouping

- A. Epithelium lining branchial cyst (lateral cervical cyst)
B. Epithelium of external auditory tube
C. Epithelium of nasolacrimal duct
D. Epithelium of lower portion of nasal cavity
E. Epithelium of posterior 1/3 of tongue

33. Which of the following does not belong in this grouping

- A. Stapes
B. Chorda tympani nerve
C. Mandibular division of trigeminal nerve
D. Lesser cornu (horn) of hyoid bone
E. Stylohyoid muscle

34. Which of the following does not belong in this grouping

- A. Syncytiotrophoblast
B. Cytotrophoblast
C. Decidua parietalis (vera)
D. Decidua basalis

35. The chorionic cavity (extraembryonic coelom) is lined with cells derived from the

- A. epiblast of inner cell mass.
B. cytotrophoblast.
C. maternal decidua.
D. A and B are correct
E. A, B, and C are correct

36. A loop of small intestine is found in the anterior mediastinum of a newborn baby. The most likely cause of this would be a
- A. failure of growth and fusion of the left pleuroperitoneal membrane with surrounding tissues.
 - ~~B. failure of muscle and connective tissue development in the dorsal mesentery of the esophagus.~~
 - ☒ C. failure of muscle and connective tissue development in the septum transversum and anterior body wall adjacent to sternum.
 - D. A and B are correct
 - ☒ E. A, B, and C are correct
37. The skeletal muscle that develops within the septum transversum receives its motor innervation from branches of
- ☒ A. cervical spinal nerves (C3, C4, C5).
 - ~~B. lower thoracic spinal nerves (T7 - T12).~~
 - ~~C. upper lumbar spinal nerves (L1 - L3).~~
 - D. A and B are correct
 - E. A, B, and C are correct
38. Invariably, the fetal portion of the placenta develops from trophoblastic structures adjacent to the
- A. inner cell mass.
 - ~~B. attachment of body stalk to chorion.~~
 - ☒ C. decidua between the conceptus and myometrium.
 - D. A and B are correct
 - ~~E. A, B, and C are correct~~
39. Full-term neonates with lower than normal birth weights may be the result of
- A. maternal tobacco smoking. ✓
 - B. simultaneous development of multiple embryo/fetuses. ✓
 - C. generalized maternal malnutrition. ✓
 - D. A and B are correct
 - ☒ E. A, B, and C are correct

40. A couple has expressed concern that their embryo/fetus in the sixth week of development may have a major chromosomal abnormality inherited from the father that produces intracellular metabolic changes but no gross morphologic changes. They wish to have a test done, as soon as possible, to confirm or deny their fears. Your considered recommendation would be

~~A.~~ an amniocentesis.
~~B.~~ a chorionic villus biopsy.
~~C.~~ an MRI.
~~D.~~ an ultrasound examination.
none of the above.

41. A mother-to-be is approximately 22 weeks pregnant with triplets. Her uterus is somewhat hyperactive and could produce a premature labor and birth. Your OB/GYN preceptor feels that the uterus can be "calmed" by appropriate bed rest and slight medication. You are asked what tests should be conducted to evaluate the maturity of the fetuses. Your considered recommendation would be

~~A.~~ an amniocentesis.
~~B.~~ a chorionic villus biopsy.
~~C.~~ an MRI.
~~D.~~ an ultrasound examination.
none of the above.

42. A young couple is curious and wants to know the sex of their baby before it is born so that they may decorate the nursery appropriately. The test you would most likely recommend would be


~~A.~~ an amniocentesis.
~~B.~~ a chorionic villus biopsy.
~~C.~~ an MRI.
~~D.~~ an ultrasound examination.

43. The secondary yolk sac provides the embryo with

A. primordial germ cells.
B. blood cells.
C. stored nutrients.
A and B are correct
A, B, and C are correct

44. Pairing and random assortment of maternal and paternal duplicated chromosomes (bivalents) occurs in
- A. mitosis.
 - B. meiosis I.
 - C. meiosis II.
 - D. A and B are correct
 - E. A, B, and C are correct
45. Replication of DNA normally occurs prior to
- A. mitosis.
 - B. meiosis I.
 - C. meiosis II.
 - D. A and B are correct
 - E. A, B, and C are correct
46. Occurs in the ovary
- A. mitosis.
 - B. meiosis I.
 - C. meiosis II.
 - D. A and B are correct
 - E. A, B, and C are correct
47. Occurs in the testis
- A. mitosis.
 - B. meiosis I.
 - C. meiosis II.
 - D. A and B are correct
 - E. A, B, and C are correct
48. X-chromosome bearing spermatozoa tend to be slightly slower but harder than Y-chromosome bearing spermatozoa. A somewhat greater chance of conceiving a female offspring may be created if sexual intercourse is carried out
- A. prior to ovulation.
 - B. subsequent to ovulation.
 - C. Both A and B are correct
 - D. Neither A nor B is correct
49. The chances of gametes carrying genetic aberrations due to crossing-over and nondisjunction of replicated homologous chromosomes increases with age in the
- A. female.
 - B. male.
 - C. Both A and B are correct
 - D. Neither A nor B is correct

50. A baby has been diagnosed as having Down's syndrome due to an occurrence of crossing-over and nondisjunction (Partial trisomy). Some of the baby's cells that were tested did not show the trisomy, but instead demonstrated a normal karyotype. The uneven exchange of genetic material most likely occurred

B  during gametogenesis of one of the parents.
during a mitotic division of the zygote or early blastula.
Both A and B are correct
Neither A nor B is correct

51. A young boy has been diagnosed as having a branchial fistula that has an internal opening in the region of the palatine tonsil. The external opening of this fistula is

A. just anterior to the tragus of the ear.
B. posterior to the auricle of the ear.
C. in the cheek.
D. posterior to the sternocleidomastoid muscle.
E. none of the above.


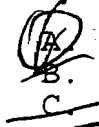
52. The pharyngeal pouch derivative that is most likely to "migrate" the farthest caudally is derived from the

A. first pharyngeal pouch.
B. second pharyngeal pouch.
C. third pharyngeal pouch.
D. fourth pharyngeal pouch.

53. A posterior cleft palate would be the result of failure of fusion between

A. the medial and lateral nasal eminences.
B. the maxillary and mandibular eminences of the first branchial arch.
C. ~~the primary palate and the lateral palatine processes~~
D. the lateral palatine processes.
E. none of the above.

54. The tissue of the hard palate that is situated anterior to the incisive foramen is most precisely derived from the

A   medial nasal eminence.
B. lateral nasal eminence.
C. frontonasal eminence.
D. lateral palatine processes.
E. none of the above.

inter max. segment

55. The intraembryonic coelom

- A. partially separates a portion of the yolk sac from the body wall. *- yolk sac*
- ☒ B. partially separates the region of the developing heart from the body wall. ✓
- C. could contain amniotic fluid at some point in time.
- ☒ D. A and B are correct
- E. A, B, and C are correct

56. The septum transversum gives rise to the

- ☒ A. the connective tissue at the peripheral of the diaphragm.
- ☒ B. connective tissue of the liver. ✓
- ☒ C. connective tissue of the dorsal mesentery.
- D. A and B are correct
- ☒ E. A, B, and C are correct

QUESTIONS 57 TO 60

- A. Decidual form of endometrium
- B. Early proliferative phase of uterine cycle
- ☒ C. Late proliferative phase of uterine cycle
- D. Secretory phase of uterine cycle
- E. Menstrual phase of uterine cycle

- ☒ D 57. Stage at time of implantation. *d 6-16 days*
- ☒ E 58. Occurs in the absence of chorionic gonadotropin production *e*
- ☒ C 59. Stage at time of ovulation. *c*
- ☒ A 60. Stage present three weeks after fertilization and successful implantation *a*

QUESTIONS 61 TO 67

- A. Cytotrophoblast cells
- B. Syncytiotrophoblast
- C. Both A and B are correct
- D. Neither A nor B is correct

- ☒ C 61. Maternal lymphocytes may come into contact with this *c*
- ☒ B 62. Major site of human chorionic gonadotropin production *b*
- ☒ D 63. A major portion derived from the maternal decidua *d*
- ☒ B 64. Produces a large portion of intraembryonic mesoderm *b*
- ☒ D 65. Always a portion of the placental barrier *d*
- ☒ D 66. Fetal erythrocytes normally come into contact with this *d*
- ☒ B 67. Maternal erythrocytes normally come into contact with this *c*

QUESTIONS 68 TO 73

- A. Epiblast
- B. Hypoblast
- C. Both A and B are correct
- D. Neither A nor B is correct

- A 68. Gives rise to intraembryonic ectoderm a
- 1 69. Gives rise to notochordal process a
- 2 70. Gives rise to intraembryonic mesoderm a
- A 71. Gives rise to amniotic epithelium a
- B 72. Gives rise to epithelium of primary yolk sac b
- D 73. Gives rise to the chorion d

QUESTIONS 74 TO 78

- A. Gametogenesis in human female
- B. Gametogenesis in human male
- C. Both A and B are correct
- D. Neither A nor B is correct

- B 74. Cells released from gonad possess a haploid number of single chromosomes b
- A 75. Cells released from gonad have undergone a form of cell division approximately 24 hours earlier a
- C 76. Cells released from gonad contain mitochondria c
- E 77. Cells released from gonad determine the sex of zygote if they participate in a fertilization b
- B 78. A portion of the chromosomal genetic material in cells released from gonad could have been in a gonia cell approximately 72 days earlier b

QUESTIONS 79 TO 88

MARK A IF STATEMENT IS TRUE
MARK B IF STATEMENT IS FALSE

- ✓ 79. Derivatives of the intraembryonic coelom are found in the head. F
80. The epithelium of the oral pharynx is derived primarily from the endoderm related to the fourth pharyngeal arch. F I
- ✓ 81. The recurrent laryngeal nerve is the primary nerve related to the fourth branchial arch. F
82. At the end of the sixth week of development, the majority of the organogenesis has been completed. F J
- ✓ 83. A teratogenic compound will cause major morphologic defects in the nervous system and cardiovascular system if present in the embryo during the second week of development. F
- ✓ 84. A major determinant of viability of babies bone prematurely is the maturity of the digestive system. F
- ✓ 85. ~~Chorionic cavity~~ fluid serves as a hydraulic wedge to assist in the dilatation of the cervix during parturition. F
86. Trophoblastic tissue may exist without the presence a fetus. T
87. Theoretically, the ovaries could be removed from a pregnant female during the second half of the pregnancy and not terminate the pregnancy. T
- T 88. The normal gestation period for humans is 266 days. 338 537 130226

QUESTIONS 89 TO 94 The following questions refer to Figure 1

89. At this stage of development, structure (area) 89 contains
- A. fetal blood.
 - ☒ B. maternal blood.
 - C. A and B are correct
 - D. Neither A nor B is correct
90. The cells lining structure (area) 90 are derived from
- A. epiblast of inner cell mass.
 - ☒ B. hypoblast of inner cell mass.
 - C. cytotrophoblast.
 - D. A and B are correct
 - E. A, B, and C are correct
91. Region (area) 91 will become the
- ☒ A. amniotic cavity.
 - ☒ B. chorionic cavity.
 - ☒ C. definitive yolk sac.
 - ☒ D. connecting stalk.
 - E. none of the above.

92. Region 92 is a portion of the

- ~~A.~~ decidua basalis.
- ~~B.~~ decidua capsularis.
- C. decidua parietalis.
- D. stratum basalis.
- E. none of the above.

93. Structure 93 is the

- A. epiblast.
- B. hypoblast.
- C. cytotrophoblast.
- D. syncytiotrophoblast.
- E. none of the above.

94. This represents a specimen obtained approximately ____ days after fertilization.

- A. 2
- B. 6
- C. 12
- D. 21
- E. 28

6-18

QUESTIONS 95 TO 97 The following questions refer to Figure 2

95. Structure 95 represents a

- A. primary villus.
- B. secondary villus.
- C. tertiary villus.
- D. none of the above.

96. Structure 96 does not include

- A. cytotrophoblastic cells.
- B. syncytiotrophoblast.
- C. extraembryonic mesoderm.
- D. decidua basalis.

97. The diagram represents tissues that could have been obtained

- A. during the first month of pregnancy.
- B. during the seventh month of pregnancy.
- C. after a normal vaginal delivery.
- D. A and B are correct
- E. A, B, and C are correct

QUESTIONS 98 TO 100 The following questions refer to Figure 3

98. Epithelium and connective tissue in area 98 is predominately derived from

- ☒ A. a portion of the frontonasal eminence.
- B. the maxillary eminence of first branchial arch.
- C. the mandibular eminence of first branchial arch.
- D. the second branchial arch.
- E. none of the above.

VII

99. Epithelium and connective tissue in area 99 is predominately derived from

- A. a portion of the frontonasal eminence.
- ☒ B. the maxillary eminence of first branchial arch.
- C. the mandibular eminence of first branchial arch.
- D. the second branchial arch.
- E. none of the above.

100. Epithelium and connective tissue in area 100 is predominately derived from

- A. a portion of the frontonasal eminence.
- ☒ B. the maxillary eminence of first branchial arch.
- C. the mandibular eminence of first branchial arch.
- D. the second branchial arch.
- E. none of the above.

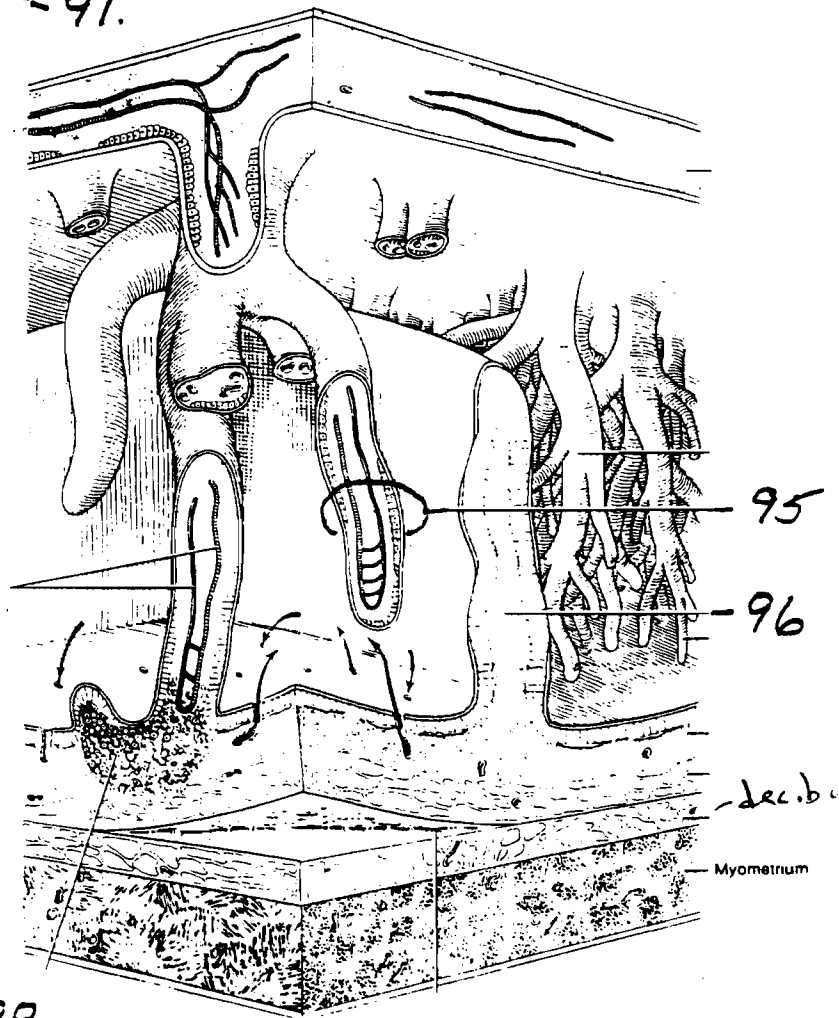
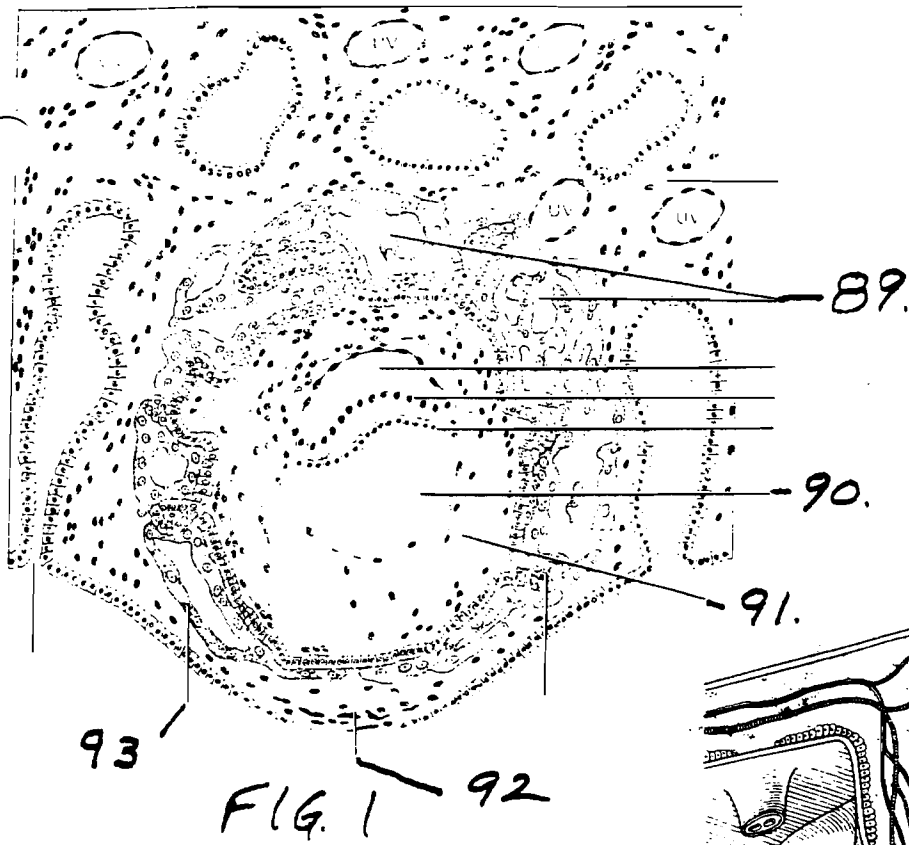
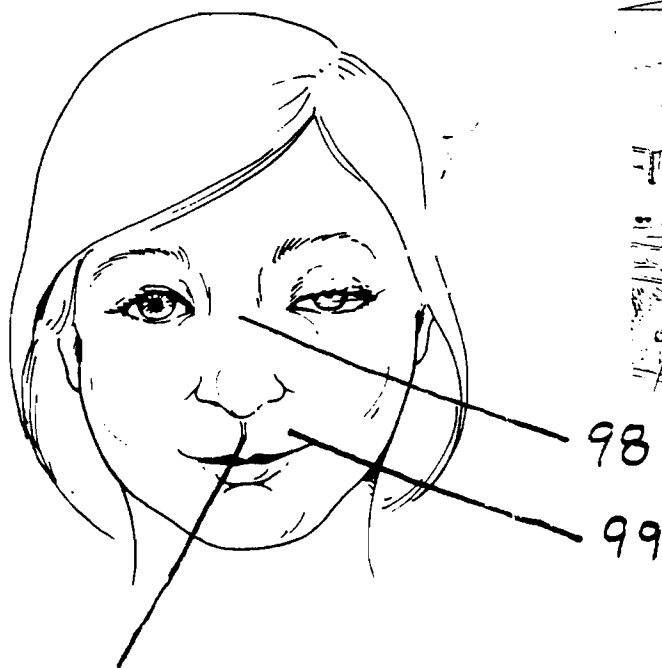


FIG. 2



100 FIG. 3